Reminders and Announcements

Class Encore Sessions: Schedule and registration opens Friday, April 3.

Discussion Sections will be held Friday, April 3

Homework 1: Complete by 11:59 p.m. on Friday, April 3

Chapter 9 Reading Questions: Complete by 11:59 p.m. on Monday, April 6

Chapter 10 Reading Questions: Complete by 11:59 p.m. on Wednesday, April 8

Outline

- Macroeconomic Data and Aggregation
- Provide and discuss a formal definition of Nominal Gross Domestic Product (GDP)
- The Expenditure, Output and Income Approach to Measure GDP
- Problems with Measuring GDP
- GDP and a Nation's Standard of Living

Readings for this lecture: Chapter 9, Sections 9-1, 9-2, 9-3 (pp. 219-235)

Readings for next lecture: Chapter 9, Sections 9-4, 9-5, 9-6 (pp. 236-242)

Macroeconomic Data and Aggregation

To measure the macroeconomy, we need "aggregate" economic data.

To Aggregate an Economy: Add together economic quantities (e.g. prices, production, jobs) measured for individual economic units (e.g. firms, people) into an economy-wide total.

Aggregation is difficult, for both practical and conceptual reasons.

- Data Collection

- Methodology

Measuring Production:
Gross Domestic Product (GDP)

The goal of GDP is to measure aggregate production of goods and services.

Definition of Nominal GDP: The market value of all final goods and services produced within a country in a year.

Decomposing the Definition of GDP: "Produced within a Country"

A nation's GDP measures only production that takes place inside its borders.

In the U.S. this would include the production of a Japanese owned car factory operating in Alabama.

This would *not* include the production of a U.S. citizen working in Paris.

Decomposing the Definition of GDP:

"Market Value"

Market Value: The market price for which a good or service was sold.

Using market values allow us to add up apples and oranges (and haircuts and airplanes!)

Decomposing the Definition of GDP:

"Final Goods and Services"

Final goods and services: "Finished" goods and services, meaning they are ready to be used or consumed by its final user.

Example: A sandwich sold to a student.

Intermediate goods and services: Items that are produced by one firm, bought by another firm, and used as an input in the production of a final good or service.

Example: Bread that was baked and then used as part of the sandwich.

Why Final Goods and Services?

Focusing on only final goods and services prevents us from **double counting** production.

In the previous example, the price of the sandwich sold to the student includes the value of the bread.

Thus, counting the sandwich and then the bread separately would double count the value of the bread.

Decomposing the Definition of GDP: "Produced" and "In a Year"

- We are interested in measuring the production that took place during a specific year.
- Thus, we do not count production that occurs outside of this year.
- Importantly, this means that resales of goods produced in a different year are not included in this year's GDP
- Example: A used car that was originally manufactured and purchased in 2016 and then resold in 2026 is part of 2016 GDP, not 2026 GDP.

Measuring GDP

GDP can be measured in three **theoretically equivalent** ways:

1) **The Expenditure Approach:** Measure *total expenditures* on final goods and services produced within a country in a year.

2) **The Output Approach:** Measure *total value-added* across the stages of production of goods and services within a country in a year.

3) **The Income Approach:** Measure *total income* received by factors of production operating within a country in a year.

The Expenditure Approach to Measuring GDP

Personal Consumption Expenditures (C): Spending by domestic households on consumer goods and services.

The word **domestic** refers to the country for which we are measuring GDP.

Examples: Books, movies, food, dental visits, economics lectures, cars, and clothes.

C is 68% of GDP in the United States.

The Expenditure Approach to Measuring GDP

Gross Private Domestic Investment (I): Spending by domestic firms on new **capital goods** and **changes to inventories**. It also includes expenditure on new homes by households.

Capital goods: Goods that are used to produce other goods and services, but are not completely used up in the production of these other goods and services. Examples: Tools, instruments, machines, buildings, housing.

Changes to inventories: Changes to the level of inventories held by firms.

I is 18% of GDP in the United States.

The Expenditure Approach to Measuring GDP

Government Expenditure on Goods and Services (G): Purchases of goods and services by the domestic federal, state and local governments.
Examples: office supplies, tanks, freeways.

G is 17% of GDP in the United States.

Important Note: Not all government *spending* is government purchases of goods and services. For example, **transfer payments** and **interest payments** are **not** included in GDP.

Transfer Payments: Cash transfers from governments to households and firms such as social security benefits, unemployment compensation, and subsidies.

The Expenditure Approach to Measuring GDP

Net Exports of Goods and Services (X-M): The value of **exports** minus the value of **imports**

Exports (X): Sales of goods and services by the domestic economy to the rest of the world.

Imports (M): Purchases of goods and services by the domestic economy from the rest of the world.

Net Exports = Exports – Imports

= (X-M)

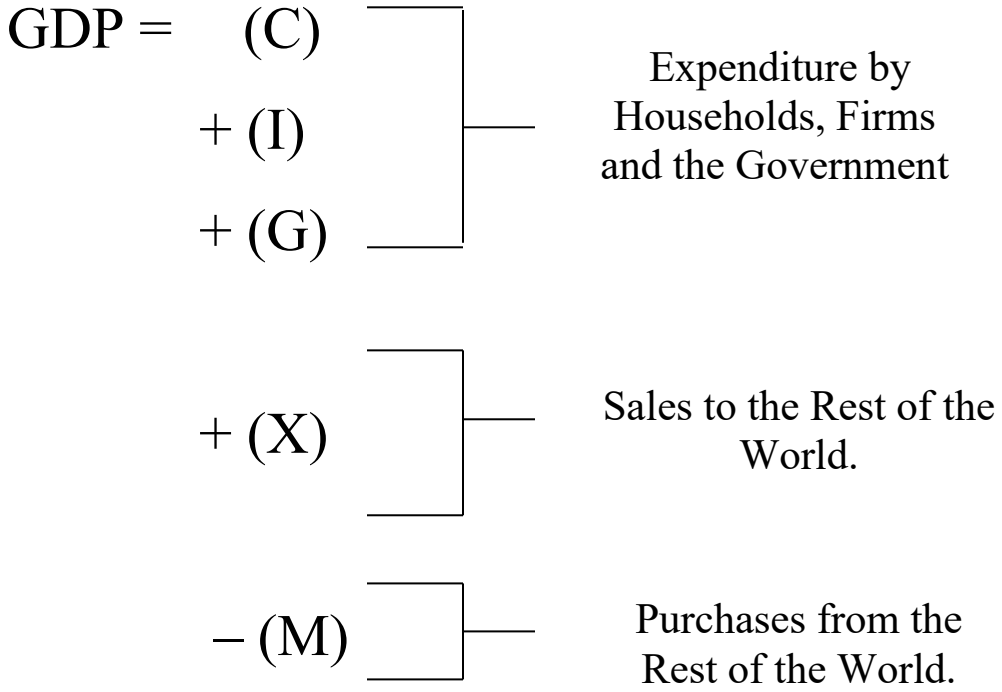
The Expenditure Approach to Measuring GDP

X-M is -3% of GDP in the United States.

When **X-M** is negative, it is called a **trade deficit**.

When **X-M** is positive, it is called a **trade surplus**.

The Expenditure Approach to Measuring GDP



Why are imports subtracted? Because C, I and G included purchases of goods from foreign economies. These should not be included in GDP, and so are netted out by subtracting imports.

The Output Approach to Measuring GDP

The Output Approach: Measure *total value-added* across the stages of production of goods and services within a country in a year.

- Value-Added: The amount by which the market value of an item exceeds the sum of the value of its intermediate inputs.

- By adding up the value-added for a final good at each stage of its production, we capture the total market value of the final good.

- The output approach gives us a deeper look at the *types* of production that make up GDP.

- One amazing statistic: The production of services makes up more than 80% of GDP!

The Income Approach to Measuring GDP

It turns out that GDP is also equivalent to the aggregate *income* earned by factors of production operating within a country during a year.

Why is this true?

Goods and services are produced using **factors of production** (labor, capital equipment, land, entrepreneurship).

Each of these factors of production is paid income for its role in production.

The total market value of the final goods and services produced is then divided among these different sources of income.

Measuring GDP in the United States

In the United States, the expenditure, output, and income approach are used by the Bureau of Economic Analysis (BEA) to measure GDP.

The BEA publishes this data in what is called the *National Income and Product Accounts* (NIPA).

www.bea.gov

Problems with GDP

GDP has some problems, both as a measure of economic production and also more broadly as a measure of economic "well being". Here we will review a few of these:

1) Market values aren't values

The contribution of different goods and services is measured only by their price.

2) What if a good or service isn't bought or sold in a market? Example:

- "Household Production"

Problems with GDP

3) What if we don't observe the market in which a good or service is traded? These markets are called the "shadow economy". Examples include:

- Illegal activity
- Unreported payments to avoid income taxes

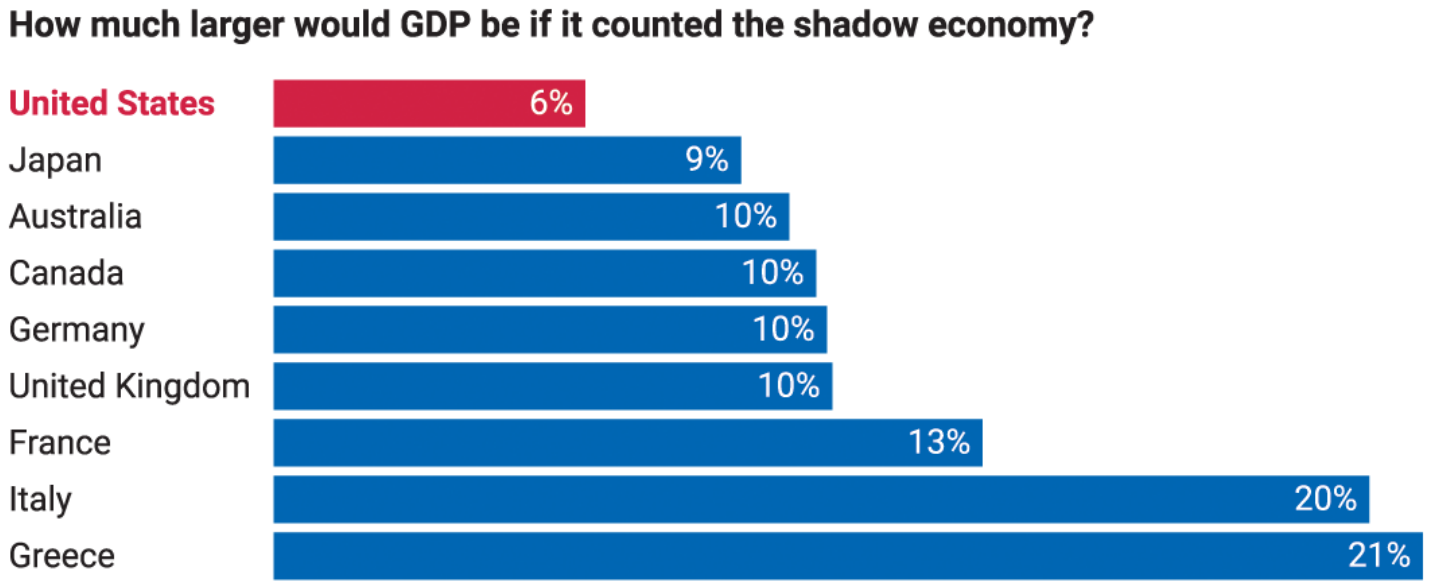


Chart: © Worth Publishers • Data from: Enste, Dominik H., "The Shadow Economy in Industrial Countries, 2014-24"

Problems with GDP

4) GDP doesn't account for damage to the environment associated with production.

- Natural Resource Depletion
- Production of pollution

5) GDP doesn't tell us anything about the amount of leisure time enjoyed by residents of a nation

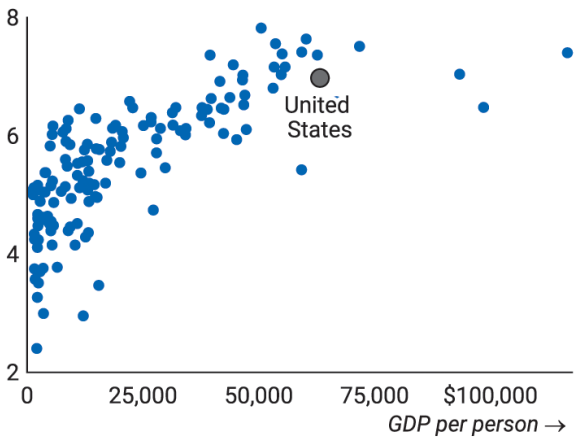
6) GDP doesn't tell us anything about the distribution of income.

GDP and Standard of Living

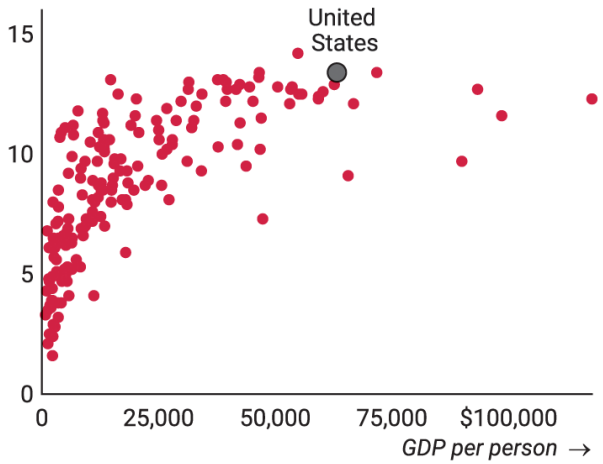
GDP is often used to make comparisons regarding a nation's **standard of living**.

Standard of living refers to a comprehensive state of economic well being, including things such as income levels, quality of housing and food, medical care, educational opportunities, transportation, communications, and other measures.

Higher GDP is associated with greater life satisfaction



Higher GDP is associated with more education



Higher GDP is associated with less infant mortality

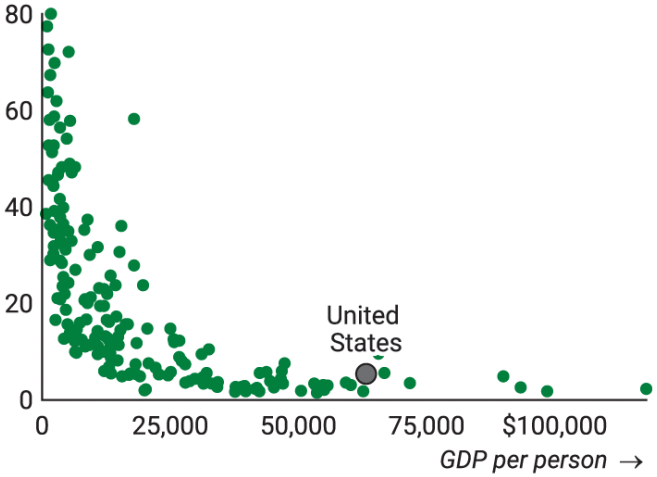
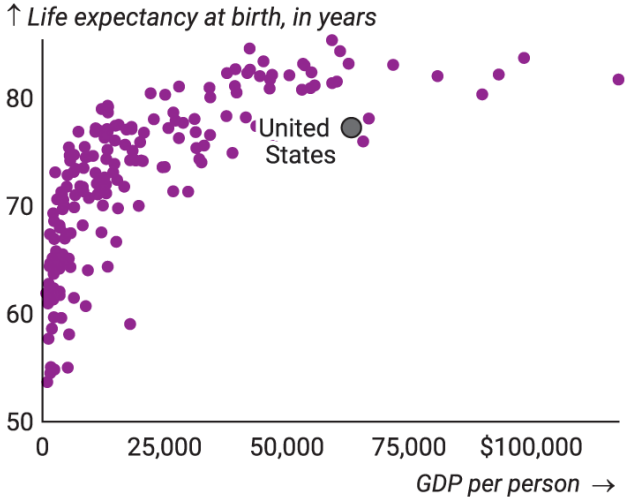


Chart: © Worth Publishers • Data from: World Bank

Higher GDP is associated with longer life expectancy



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